



## Review

## Origin and development of forensic medicine in Egypt

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## ABSTRACT

Egyptians are one of the first civilisations to practice the removal and examination of internal organs of humans. Their practices ranged from embalming to faith healing to surgery and autopsy. Modern radiological studies, together with various forensic techniques, allowed scientists unique glimpses of the state of health in Egypt 4000 years ago and discovered one of the earliest applications of autopsy, the main element of forensic medicine practice today.

The Egyptian Forensic Medicine Authority handles a relatively large number of cases annually and depends on different assisting laboratories (forensic histopathology, microbiology, serology unit, DNA laboratory, forensic chemistry laboratory) as well as the Counterfeiting and Forgery unit. Crime scene investigations are performed mainly through the criminal laboratory related to the Ministry of Interior.

Forensic Medicine is studied thoroughly in the faculty of medicine (undergraduates), as well as by forensic medical examiners at postgraduate level (diploma, master's and doctorate). This review recommends more scientific cooperation with universities in the field of forensic medicine and related sciences to solve various crimes with meticulous detail.

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## 1. Introduction

Forensic science is a broad term that encompasses a growing group of subspecialties in science and medicine, all of which convey fundamental methods, hopefully both scientifically valid and legally admissible, for the presentation of evidence in courts of law.<sup>1</sup>

Medicine and law are related from the earliest times by the bonds of religion, superstition, and magic. The functions of the physician and the jurist were united in the priest, the intermediary between God and man. In early civilisations, primitive legal codes, religious doctrines, and social precepts were often ill-distinguished, and laws with a medical content were often found within their context.<sup>2</sup>

Information about ancient medical practice in Egypt comes from images that often adorn the walls of Egyptian tombs and the translation of the accompanying inscriptions. Advances in modern

medical technology contributed to the understanding of ancient medicine. Paleopathologists used X-rays and later CAT Scans to view the bones and organs of mummies. Electron microscopy, mass spectrometry and various forensic techniques allowed scientists unique glimpses of the state of health in Egypt 4000 years ago.<sup>3</sup>

In ancient Egypt, the acts of the medical man were restricted by law. Stab wounds were differentiated in the 17th century B.C. The Egyptians had a thorough knowledge of poisons. There is evidence that priests made determinations regarding the cause of death and whether it was natural.<sup>4</sup>

The practices of Egyptian medical practitioners ranged from embalming to faith healing to surgery and autopsy. The use of autopsy came through the extensive embalming practices of the Egyptians, as an embalmer likely examined the body for a cause of death. Surgery also evolved from a knowledge of basic anatomy and Egyptian embalming practices.<sup>5</sup>

The embalmers, who were probably of a low social class, removed the internal organs and observed normal and abnormal tissues. Apparently, they did not communicate their observations to priests or other upper-class individuals who might practice

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medicine or write about scientific findings. Available Egyptian records, such as the Edwin Smith papyrus and the Ebers papyrus, demonstrate knowledge of anatomy.<sup>6,7</sup>

Imhotep, an old Egyptian King in the 3rd Pharaonic dynasty, is credited as the original author of the papyrus text and the founder of ancient Egyptian medicine. The earliest known surgery was performed in Egypt around 2750 BC. There is also considerable interest in bodily structures in reference to wounds and fractures. But structure did not seem to play a part in “medical” diseases, which were believed to be the result of magic and were best treated by further magic.<sup>8,9</sup>

All notes written by the ancient Egyptians, Babelis and Sumerians confirmed that forensic medicine began in the pre-written history era and deep history period that is known as the Arab orient and then appeared in Persia and China when most of the current developed world knew little about forensic medicine.<sup>8,10</sup> The Law of Hammurabi, King of Babel (now South Baghdad, Iraq), was the principle legislation of the medical profession and the doctor’s code of conduct towards his patients. It is also the law responsible for regulation of both sections of the profession known at that time, internal medicine and surgery.<sup>10</sup>

## 2. Forensic medicine in modern Egypt

In modern Egypt, the genuine advancement of and attention to medicine in general goes back to Mohammed Ali Pasha, the founder of Egypt’s modern renaissance who established the School of Medicine in Abi Zaabal in 1820 and recruited foreign doctors, such as Dr. Clot Beck, who organised the School of Medicine and worked as a senior doctor and surgeon in the Egyptian army. He started forensic education in the School of Medicine as part of the internal medicine syllabus. The first class of Egyptian doctors graduated from the school in 1832, and in the same year the first Egyptian mission of 12 doctors was sent to France.<sup>8</sup>

In 1862, Khedive Ismail delegated Dr. Ibrahim Pasha Hassan to France and Austria to specialise in forensic medicine and returned to teach the subject as an independent science in the School of Medicine of Eini Palace. Then, Doctors Nolan and Hamilton and Sir Sydney Smith continued their work with the establishment of the Egyptian university when the School of Medicine was transferred to the Faculty of Medicine. A special seat for Forensic Medicine was established under the supervision of Dr. Sir Sydney Smith for 11 years, 23/7/1917 to 21/5/1928 until he returned to Edinburgh University. He was followed by Dr. Glaister who continued to occupy this title until 1932 when he was appointed Professor of Forensic Medicine at Glasgow University.<sup>8</sup>

The first Forensic Medicine department was established in 1890 by the General Prosecutor within the National Appellate Court, Bab Al-Khalq, in Cairo. Three forensic medicine doctors worked within this department led by the Public Health Department. In November 1920, the Minister of Justice Mr. Ahmad Khashaba issued the Forensic Medicine Act regulating the work of the Forensic Medicine Department in Cairo that was equipped with an independent Chemical Laboratories under the chairmanship of Sir Sydney Smith. Sir Smith also served as Forensic Medicine lecturer of the Faculty of Medicine of Al Eini Palace (Faculty of Medicine of Cairo University). On 6/5/1931, a decision was issued by the Council of Ministers separating the Forensic Department from the General Prosecutor’s Office and transferring the Department into the Forensic Medicine Authority. Accordingly, the number of forensic medicine doctors increased from 16 to 22 doctors, and the chief senior doctor was Mr. Mahmoud Beck Maher. The Forensic Medicine Authority was affiliated with the Ministry of Justice in 1932. It consisted of the main office of the senior forensic medicine doctor who also served as Forensic Medicine Authority chairman and supervised the other

assisting departments (chemical analysis, bacteriological and pathology analysis labs) and their main offices in all governorates, e.g. Cairo, Alexandria, Asyut (established in 1922) and Tanta (established in 1930). Subsequently, other offices were established all over the country until the number reached 11 in 1952 and 17 in 1964.<sup>11</sup>

The Egyptian Ministry of Justice provides Forensic Medicine Authority with necessary guarantees and endorsements that help the chief forensic medical doctor and his colleagues appoint the best doctors, pharmacists, chemists, technicians and photographers, and each member is named an “expert”. Many received scholarships in their specialties abroad to fortify their experiences from national work and research. This qualifies the Forensic Medicine Authority to employ forensic doctors as well as their colleagues in different fields of forensic sciences (chemicals, pathological and microbiological lab analysis) and forgery research, criminal photography, and photographic drawings. All these specialties comprise the Forensic Medicine Administration and aim to be a scientific institute for forensic medicine in the Middle East. It has a well-known international reputation and position, and the staff members have good experience due to the relatively high number and diversity of cases (Table 1).<sup>12</sup>

Crime scene investigations are performed mainly by crime scene experts of the Ministry of Interior. The staff members of the Ministry of Interior Criminal Laboratories sometimes confirm the Forensic Medicine Authority reference labs, e.g. the forensic chemistry laboratory, for security reasons. In Egypt, the Forensic Medical Examiner does not have any direct relationship with police officers or investigators except when sharing a crime scene examination of highly selected cases. Both teams from the Ministry of Interior (represented by police officers and crime scene experts) and the Ministry of Justice (represented by forensic medical examiners) receive orders and requests from the general attorney or judges in courts, in case of criminal investigations and maintaining the chain of custody in case of evidence delivery between the attorney and the Forensic Medicine Authority experts.<sup>13</sup>

All forensic medical examiners in the Forensic Medicine Authority in Egypt work only for the Egyptian Ministry of Justice, and they are not allowed to work in any other medical jobs, either independently or in conjunction with other parties. Moreover, they provide the complete chain of evidence and secrecy when dealing with clinical forensic cases and report only to general attorneys or judges in courts. Forensic medical examiners are only paid from the Ministry of Justice and are very well-paid, compared to doctors in other specialties. For expert witnesses in courts, payments depend upon the nature and requests of each case (whether civilian or criminal case) and the length of the study period, particularly in cases of compensation for damages in accidents and malpractice cases. Payment is estimated by a panel of judges, according to the ministerial rules and regulations.<sup>13</sup>

An expert deals with each criminal case as if he is working on scientific research. Quality improvement is the main target, and follow-up procedures are necessary for the trust of competent authorities such as the general prosecutor’s office, judiciary and rivals. They also gain the confidence of the Arab world, as they have the largest manpower with legal and social backgrounds and are

**Table 1**

Distribution of cases presented to the Forensic Medicine Authority and related departments and offices (2000–2009).<sup>14</sup>

Cases	Number
Forensic medicine cases, including mass disasters	3,91,881
Laboratory of Forensic Histopathology	1,98,408
Laboratory of Forensic Chemistry	6,29,534
Counterfeiting and forgery	3,89,546
Total	16,09,369

proficient in Arabic. Many Arabic countries, such as Saudi Arabia, Kuwait, Bahrain, and United Arab Emirates, recruit many Egyptian forensic medical doctors for mutual government benefit and Arabic unity in this rare medical specialty. At present there are approximately 150 forensic medical examiners related to the Forensic Medicine Authority in Egypt; 50% of them are working in the Arab countries. The numbers of Egyptian forensic medical examiners who worked in Arab countries in past 50 years are shown in Table 2.<sup>14</sup>

The rules regulating forensic medicine practice in Egypt are shown in Table 3.

### 3. Roles of staff members of Forensic Medicine Authority in Egypt

At the present time, the main components of the Forensic Medicine Administration are the following: (i) forensic medical examiners' offices, (ii) forensic medical laboratories, (iii) forensic chemistry units, and (iv) the counterfeiting and forgery units.

#### 3.1. The forensic medical examiners' offices

The forensic medical examiner performs a **complete death investigation**, including crime scene investigation, external examination, complete autopsy procedure, necessary sampling for toxicology screening and histopathological examination, and prepares a final medicolegal report to the general prosecuting authority. In addition, forensic medical examiners are responsible for examination of living persons (clinical forensic medicine). The roles of the forensic medical examiner in Egypt are shown in Table 4.<sup>13</sup>

#### 3.2. The forensic medical laboratories

The forensic medical laboratories are divided into the following units: (1) serology unit, (2) forensic histopathology unit, (3) genetic research unit, and (4) microbiology unit. Their experts conduct the following necessary examinations and analysis of tissue biopsies or samples taken from different criminal or civil cases: blood and sperm and their grouping and matching, biochemistry, histopathology examination, bacteriological studies, and DNA fingerprinting.<sup>15</sup>

#### 3.3. The forensic chemistry units

These units are comprised of a central laboratory and seven departments distributed all over the country. The experts conduct necessary tests and analyses of all biological samples, tissue samples or items sent from the police departments in criminal cases. These labs have the ability to detect and quantify poisons (natural, pharmaceutical and illicit street drugs), including morphine and its derivatives, hypnotics, alcohol, amphetamines (natural and not natural), other screened drugs and elements, and trace elements of explosives, burners, explosion accelerators, and ignition aids.<sup>15</sup>

**Table 2**  
Numbers of Egyptian forensic medical examiners who worked in Arab countries in the past 50 years.<sup>14</sup>

Country	Number
Kingdom of Saudi Arabia	78
Libya	20
United Arab Emirates	15
Kuwait	15
Bahrain	3
Jordan	3
Qatar	3
Total	137

**Table 3**  
Rules regulating forensic medicine practice in Egypt.<sup>13</sup>

Rules of forensic medicine practice
This comprises:
- The work of forensic medical is presented to the judiciary courts as approved by Decree No. 96 for 1952.
- The forensic medicine expert in Egypt should not combine their work and any other business, occupation or profession.
- Forensic medicine experts are not allowed without permission to act as an arbitrator with or without pay in any dispute using his/her knowledge to decide upon any disputes even if it is not being raised to the court.
- Forensic medicine experts are not allowed to present any consultative reports.
- Forensic medicine experts are not allowed to appoint any receiver or mediator for any creditors according to article (44) of Act (96) for year 1952.
- The experts conduct their work and help the Egyptian judicial bodies in all issues requiring technical forensic medicine expertise at all levels.
- The Forensic Medicine Administration experts practice their work under the direct authority of the Egyptian judiciary in order to ensure and maintain their neutrality and independence and avoid any possible pressure affecting their decisions.
- The Ministry of Justice in Egypt spare no efforts to develop the Forensic Medicine Administration continuously to cooperate with all scientific developments and progressive technology in various forensic and medical fields. The Forensic Medicine Administration is considered one of the important elements of justice in Egypt.
- Egypt will never prevent the efforts of its own citizens or the experts of the Forensic Medicine Administration for the development and help of other Arab countries.

#### 3.4. The counterfeiting and forgery units

These units are comprised of a central department and eight departments all over Egypt. The experts examine currency notes, stamps, molds, printers and automatic publications to ensure their correctness, and they are responsible for examining documents and written signatures for forgery or counterfeiting by change, deletion or addition. There is continuous collaboration with a similar department of criminal experts in the Ministry of Interior Criminal Laboratories.<sup>15</sup>

### 4. Forensic medicine and academics in Egypt

Forensic medicine and related undergraduate studies are well appreciated by the Ministry of Higher Education, and their teaching programs are well prepared. Faculty of medicine and faculty of Science in all Egyptian universities have undergone these programs. All through the fourth year, the undergraduate medical student must complete a comprehensive curriculum on forensic medicine as well as clinical and forensic toxicology. Practical experiences through museum specimens and documentary materials, in addition to clinical case studies, are essential components of the learning process. The main emphases are frequently-encountered medicolegal problems and common poisoning conditions and basic management. Recently, nursing students study forensic medicine and basic toxicology knowledge through simplified courses, both in Arabic and in English, to provide sufficient information in the fields of legal medicine and poisoning management.

### 5. Scientific & practical cooperation with academics in Egypt

Academic departments of forensic medicine and clinical toxicology have hundreds of staff members. They cooperate enthusiastically with the Forensic Medicine Authority, but only through personal contact on a sporadic basis. Academic staff members in

**Table 4**The roles of the forensic medical examiner in Egypt.<sup>13</sup>

Roles	Comments
Complete death investigation	Comprised of the following: <ul style="list-style-type: none"> <li>- Death investigation in criminal and suspicious cases</li> <li>- Mass disasters</li> </ul>
Clinical forensic medicine	Comprised of the following: <ul style="list-style-type: none"> <li>- Sexual Assault Examinations</li> <li>- Forensic medical examinations of living persons injured in civil cases and criminal cases</li> <li>- Age estimation of living persons in cases required by law</li> <li>- Examination of civil affairs cases (disputed paternity – impotence – mental disorder – medical malpractice) as a member of a team of medical consultants of relevant medical specialties</li> <li>- Identifying work injuries and occupational diseases and determining the degree of permanent infirmity and disability.</li> <li>- Medicolegal examination for (1) evaluation of a prisoner's fitness for imprisonment and necessity for hospitalisation and (2) the prisoners in police cells (small police jails) when there is a claim of torture or maltreatment during or after arrest (but in custody).</li> <li>- Attending cases of execution to confirm death.</li> <li>- Attending the general attorney offices and courts of different levels to discuss criminal cases as an expert witness</li> </ul>

forensic medicine departments must receive practical postgraduate training for up to three to six months and pass a final practical examination in forensic medicine administration before obtaining a Master/Doctorate degree in forensic medicine, e.g. Forensic Medicine Department, Faculty of Medicine, Ain Shams University, in Cairo. The forensic medical examiners in the ministry of Justice follow the same rules in coordination with the different universities during postgraduate classes and examinations, and they are permitted to access postgraduate studies (diplomas, master's and doctorates) in all universities.<sup>16</sup>

Moreover, scientific conferences and meetings are held annually in Egypt with attendance of both parties (Ministry of Justice and Ministry of Higher Education) and members of the criminal laboratory (Ministry of Interior). These conferences are considered a cooperative effort of the three ministries.<sup>16</sup>

Another area of scientific cooperation is the field of scientific research and international publishing. Some academic staff members perform research in collaboration with the Forensic Medicine Authority technical support departments, and their studies are published in international journals, e.g. Journal of Forensic and Legal Medicine.<sup>17,18</sup> Similarly, some Forensic Medicine Authority medical examiners perform research in conjunction with staff members of Egyptian universities and other international experts, and their results are published in international journals as well.<sup>19–24</sup>

After retirement from the Forensic Medicine Authority, their staff members participate in forensic medicine consulting units and provide paid medicolegal opinions and reports for victims or suspects, opposing or advocating the official governmental reports issued from the Forensic Medicine Authority. These offices work either independently or in conjunction with other universities and collaborate with other staff members from other universities in Egypt or other countries. They provide testimony in opposition to the official Ministry of Justice medicolegal reports, and they are accepted by courts due to their academic and practical experience either in Egypt or in other Arab countries. The courts in Egypt usually consider these academic reports before judgment, because they may carry different scientific points-of-view.

## 6. Recommendations

The authors suggest a scientific partnership between the Egyptian Forensic Medicine Administration and universities in the fields of forensic medicine and related sciences to use diverse practical experiences and meticulous detail to solve crimes.

Highlighting the national research of the staff members of the Administration in a newly issued scientific journal will improve the literature and promote further cooperation with other countries.

Revitalisation of these methods, which were implemented at the beginning of this century, will highlight medicolegal work in Egypt on an international scale.

### Conflict of interest

There is no conflict of interest between any of the authors.

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